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PTO/SB/05 (03-01)
Approved for use through 10/31/2002. OMB 0651-0032
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UTILITY PATENT APPLICATION TRANSMITTAL

(Only for new nonprovisional applications under 37 CFR 1.53(b))

Attorney Docket No.	
First Inventor	Si-Nin-Quan
Title	revolutionary connections for spark plugs and wires
Express Mail Label No. _____	

J1017 U.S. PTO
09/995872

11/29/01

APPLICATION ELEMENTS

See MPEP chapter 600 concerning utility patent application contents.

1. Fee Transmittal Form (e.g., PTO/SB/17)
(Submit an original and a duplicate for fee processing)
2. Applicant claims small entity status.
See 37 CFR 1.27.
3. Specification [Total Pages **6**]
(preferred arrangement set forth below)
 - Descriptive title of the invention
 - Cross Reference to Related Applications
 - Statement Regarding Fed sponsored R & D
 - Reference to sequence listing, a table,
 or a computer program listing appendix
 - Background of the Invention
 - Brief Summary of the Invention
 - Brief Description of the Drawings (if filed)
 - Detailed Description
 - Claim(s)
 - Abstract of the Disclosure
4. Drawing(s) (35 U.S.C. 113) [Total Sheets **4**]
5. Oath or Declaration [Total Pages **2**]
 a. Newly executed (original or copy)
 b. Copy from a prior application (37 CFR 1.63 (d))
(for continuation/divisional with Box 18 completed)
 i. **DELETION OF INVENTOR(S)**
 Signed statement attached deleting inventor(s)
 named in the prior application, see 37 CFR
 1.63(d)(2) and 1.33(b).
6. Application Data Sheet. See 37 CFR 1.76

ADDRESS TO: Assistant Commissioner for Patents
Box Patent Application
Washington, DC 20231

7. CD-ROM or CD-R in duplicate, large table or
Computer Program (Appendix)
8. Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
- a. Computer Readable Form (CRF)
- b. Specification Sequence Listing on:
 i. CD-ROM or CD-R (2 copies); or
 ii. paper
- c. Statements verifying identity of above copies

ACCOMPANYING APPLICATION PARTS

9. Assignment Papers (cover sheet & document(s))
37 CFR 3.73(b) Statement Power of
(when there is an assignee) Attorney
10. English Translation Document (if applicable)
11. Information Disclosure Statement (IDS)/PTO-1449 Copies of IDS
Statement (IDS)/PTO-1449 Citations
12. Preliminary Amendment
13. Return Receipt Postcard (MPEP 503)
(Should be specifically itemized)
14. Certified Copy of Priority Document(s)
(if foreign priority is claimed)
15. Nonpublication Request under 35 U.S.C. 122
(b)(2)(B)(i). Applicant must attach form PTO/SB/35
or its equivalent.
16. Other: _____

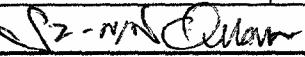
18. If a CONTINUING APPLICATION, check appropriate box, and supply the requisite information below and in a preliminary amendment, or in an Application Data Sheet under 37 CFR 1.76:

Continuation Divisional Continuation-in-part (CIP) of prior application No. _____ / _____

Prior application information: Examiner _____ Group Art Unit: _____

For CONTINUATION OR DIVISIONAL APPS only: The entire disclosure of the prior application, from which an oath or declaration is supplied under Box 5b, is considered a part of the disclosure of the accompanying continuation or divisional application and is hereby incorporated by reference. The incorporation can only be relied upon when a portion has been inadvertently omitted from the submitted application parts.

19. CORRESPONDENCE ADDRESS

<input type="checkbox"/> Customer Number or Bar Code Label	<input type="checkbox"/> (Insert Customer No. or Attach bar code label here)		or	<input checked="" type="checkbox"/> +	Correspondence address below		
Name	Si-Nin Quan						
Address	3186 Yakima circle						
	City	San Jose	State	CA	Zip Code	95121	
Country	U.S.A.	Telephone	408-226-4907	Fax	226-4907		
Name (Print/Type)	Si-Nin Quan		Registration No. (Attorney/Agent)				
Signature			Date	NOV 23, 2001			

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FEE TRANSMITTAL for FY 2002

Patent fees are subject to annual revision.

 Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT (\$ 740.00)

Complete if Known

Application Number

Filing Date

First Named Inventor

Examiner Name

Group Art Unit

Attorney Docket No.

METHOD OF PAYMENT (check all that apply)

Check Credit card Money Order Other None

Deposit Account:

Deposit Account Number	
Deposit Account Name	

The Commissioner is authorized to: (check all that apply)

- Charge fee(s) indicated below Credit any overpayments
- Charge any additional fee(s) during the pendency of this application
- Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

FEE CALCULATION

1. BASIC FILING FEE

Large Entity	Small Entity	Fee Description	Fee Paid
Fee Code (\$)	Fee Code (\$)		
101 740	201 370	Utility filing fee	740
106 330	206 165	Design filing fee	
107 510	207 255	Plant filing fee	
108 740	208 370	Reissue filing fee	
114 160	214 80	Provisional filing fee	

SUBTOTAL (1) (\$ 740)

2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Extra Claims	Fee from below	Fee Paid
Total Claims	-20** =	X =
Independent Claims	-3** =	X =
Multiple Dependent		=

Large Entity	Small Entity	Fee Description
Fee Code (\$)	Fee Code (\$)	
103 18	203 9	Claims in excess of 20
102 84	202 42	Independent claims in excess of 3
104 280	204 140	Multiple dependent claim, if not paid
109 84	209 42	** Reissue independent claims over original patent
110 18	210 9	** Reissue claims in excess of 20 and over original patent

SUBTOTAL (2) (\$)

** or number previously paid, if greater; For Reissues, see above

FEE CALCULATION (continued)

3. ADDITIONAL FEES

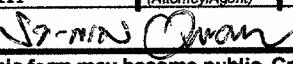
Large Entity	Small Entity	Fee Description	Fee Paid
Fee Code (\$)	Fee Code (\$)		
105 130	205 65	Surcharge - late filing fee or oath	
127 50	227 25	Surcharge - late provisional filing fee or cover sheet	
139 130	139 130	Non-English specification	
147 2,520	147 2,520	For filing a request for ex parte reexamination	
112 920*	112 920*	Requesting publication of SIR prior to Examiner action	
113 1,840*	113 1,840*	Requesting publication of SIR after Examiner action	
115 110	215 55	Extension for reply within first month	
116 400	216 200	Extension for reply within second month	
117 920	217 460	Extension for reply within third month	
118 1,440	218 720	Extension for reply within fourth month	
128 1,960	228 980	Extension for reply within fifth month	
119 320	219 160	Notice of Appeal	
120 320	220 160	Filing a brief in support of an appeal	
121 280	221 140	Request for oral hearing	
138 1,510	138 1,510	Petition to institute a public use proceeding	
140 110	240 55	Petition to revive - unavoidable	
141 1,280	241 640	Petition to revive - unintentional	
142 1,280	242 640	Utility issue fee (or reissue)	
143 460	243 230	Design issue fee	
144 620	244 310	Plant issue fee	
122 130	122 130	Petitions to the Commissioner	
123 50	123 50	Processing fee under 37 CFR 1.17(q)	
126 180	126 180	Submission of Information Disclosure Stmt	
581 40	581 40	Recording each patent assignment per property (times number of properties)	
146 740	246 370	Filing a submission after final rejection (37 CFR § 1.129(a))	
149 740	249 370	For each additional invention to be examined (37 CFR § 1.129(b))	
179 740	279 370	Request for Continued Examination (RCE)	
169 900	169 900	Request for expedited examination of a design application	
Other fee (specify) _____			

*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) (\$)

SUBMITTED BY

Complete if applicable

Name (Print/Type)	Si-Nin Quan	Registration No. (Attorney/Agent)	Telephone	408-226-4907
Signature			Date	Nov 23, 2001

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PATENT APPLICATION OF

Si-Nin Quan

Judy, Fei-Man Quan

San Jose, CA

for

TITLE: REVOLUTIONARY CONNECTIONS FOR SPARK PLUGS
AND SPARK PLUG WIRES

Form SB/08A---Information disclosure statement by applicant is
attached hereto, disclosing relevant prior-art references.

FEDERALLY SPONSORED RESEARCH

Not Applicable

SEQUENCE LISTING OR PROGRAM

Not Applicable

BACKGROUND OF THE INVENTION

This invention relates to secondary ignition system for internal combustion engines, specifically to an improved positive locking function and easy removal for conventional spark plugs and spark plug wires connections.

Variety of connections have been used in spark plugs and plug wires couplings, the most popular style is click-in, push to connect and pull to disconnect. Push to connect will create confusion sometimes whether said connections are secured or just being snug? Bench test reveals free spinning of components from said connections even though they are tight and secured. Self-seperation occurs occasionally due to aging, repeated services, thermal cycles, vibration and high voltage conduction. If said self-seperation should happen, it will cause pollution, poor performance and possibly internal engine damage. Pull to disconnect is another negative factor, when pulling is exercised, there is tendency of tearing components apart, rubber boot being torn possibly damaging the core in the plug wire, misfire would happen. In addition to surrounding high temperature, confined space, service personnel always have to face frustration, struggle or even minor bodily injuries in the field of servicing said connections. Numerous prior arts offered remedies, particularly U.S.PAT.no.(5,332,394), Frost Jul., 1994 and U.S.PAT.no.(4,810,198), Sturdevan Mar.,1989. Since all connections are couplers, concentrating upon one end will not reach ultimacy, the essence of my invention is synchronizing the other end which is the spark plug tip, an all-time solution.

SUMMARY

The invention will bring maintenance, services and repairs to a new boundary by providing simple, effortless procedure for servicing spark plugs and plug wires connections. The positive locking feature ensures an EPA issue-nonmisfiring, the self-pop-up released feature is a phenomenon to all related service personnel.

DRAWINGS

Drawing figures

Fig 1 shows conventional spark plug.

Fig 2 shows new configuration of spark plug tip.

Fig 3 shows top view of trust washer with inside diameter $\pm 6\text{mm}$, outside diameter $\pm 9\text{mm}$, due to various spark plug tip design, inside diameter should be recalibrated to fit individual application.

Fig 4 shows compressible spring with free height $\pm 14\text{mm}$, outside diameter $\pm 9\text{mm}$.

Fig 5 shows spark plug tip with built-in slot-pins $\pm 9\text{mm}$ in length.

Fig 5A shows top view of spark plug tip with built-in slot-pins.

Fig 6 shows new configuration of spark plug tip after assembly.

Fig 7 shows conventional plug wire with stationary rubber boot.

Fig 7A shows built-in metal clip 14, rubber boot not shown.

Figs 8-8A show front and rear views of new embodiment with predetermined slots and omission of metal clip 14.

Fig 8B shows top view of Figs 8 and 8A.

Fig 9 shows adaptor for modified spark plug tip and conventional spark plug wire, an alternative embodiment.

Fig 10 shows new configuration after assembly, a preferred embodiment.

Fig 11 shows adaptor for modified spark plug tip and conventional spark plug wire metal clamp, an alternative embodiment.

REFERENCE NUMERALS IN DRAWINGS

10	built-in slot-pins	12	thrust washer
14	metal clip	16	metal clamp
18	rubber boot	20	plug wire (partial)
22	built-in slots	24	adaptor

DETAILED DESCRIPTION

Preferred embodiment

Drill a predetermined hole through upper portion of a conventional spark plug tip, install compressible spring over plug tip, put thrust washer on top of said spring, insert a predetermined slot-pin or cotter-pin through the hole to hold said washer and spring in place. The said assemblage can also be put together with built-in slot-pins in manufacturing process of spark plugs.

The spring clip in conventional plug wire metal clamp will be omitted, predetermined slots are built in metal clamp, recommend

material for modified metal clamps be superior than existing counterpart. Rubber boot will be made to slide along plug wire instead of stationary, same modification can be applied to Hemi style long-reached plug wire and Distributorless individual ignition coil design.

Alternative embodiment

An adaptor can be built with conventional plug tip at one end, which will fit conventional plug wire metal clamp, while the other end with predetermined slots will fit in spring-loaded plug tip. The advantage here is no modification needed for conventional plug wires, but non locking character still exists.

OPERATION

The invention provides simple steps to connect and disconnect spark plug wires from spark plugs. For removal, slide rubber boot 18(Fig 7) upward to expose enough metal clamp of plug wire 20(Fig 8) press said metal clamp down, turn counter clockwise to release, since plug tip is spring-loaded, said metal clamp will be pushed out after it clears the slot-pins. Compare to what mechanics are doing these days like twisting, pulling and yanking, this self-pop-up is a phenomenon. For installation, hold said metal clamp against matching slot-pins (can be felt easily), once metal clamp clears said slot-pins, press down and turn clockwise to lock, the spring will urge upon said metal clamp, forming a positive locking position, slide down said rubber boot firmly. With conventional snap and pull connections, even experienced mechanic can't be certain said connections are secured or just being snug, now they are black and white!

CLAIMS

We claim:

1. A connection of the type comprising a modified spark plug tip and a modified spark plug wire metal clamp, the improvement wherein said connection has positive lock and easy disconnection features.
2. The connection of claim 1 wherein said spark plug tip has predetermined pins to which metal clamp of said spark plug wire can hook on.
3. The spark plug tip of claim 2 wherein has predetermined spacer and flexible means which are positioned by said pins.
4. The connection of claim 1 wherein said spark plug wire has predetermined slots built-in metal clamp.
5. The metal clamp of claim 4 wherein has sliding rubber boot.
6. A connection of the type comprising a modified spark plug tip and a modified spark plug wire metal clamp, characterized in easy junction.
7. The connection of claim 6 wherein said spark plug tip has predetermined dowels to which metal clamp of said spark plug wire can hook on.
8. The spark plug tip of claim 7 wherein has predetermined washer and compressible means which are held down by said dowels.
9. The junction of claim 6 wherein said spark plug wire metal clamp has predetermined grooves.
10. The metal clamp of claim 9 wherein has movable rubber boot.

REVOLUTIONARY CONNECTIONS FOR SPARK PLUGS
AND SPARK PLUG WIRES

ABSTRACT

With two features of positive lock and self-pop-up, the invention provides simple procedure for connecting and disconnecting spark plugs and spark plug wires, a union of prevention and ensurer.

FIG. 1 FIG. 2

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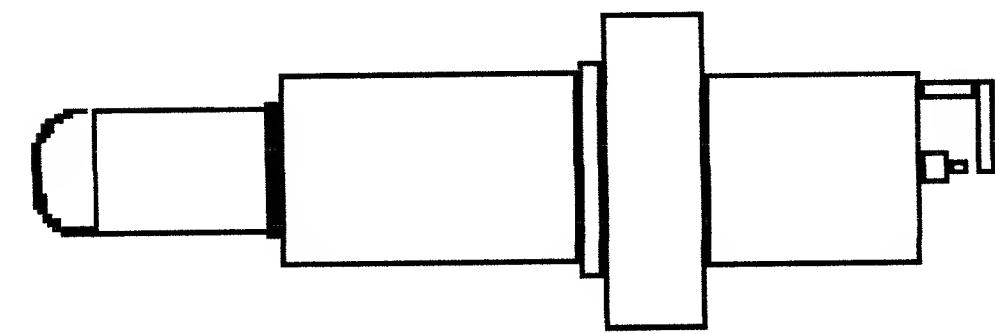
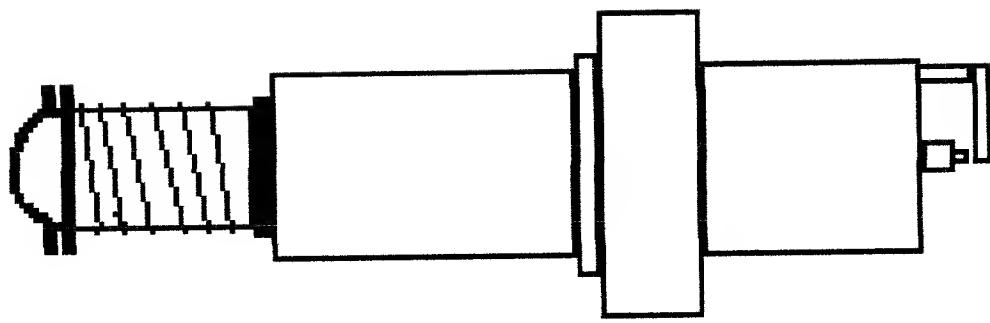


FIG. 1

FIG. 2



Z/4

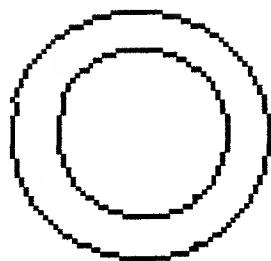


FIG. 3

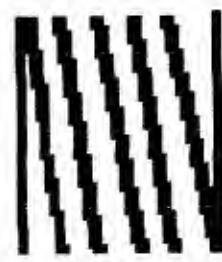


FIG. 4

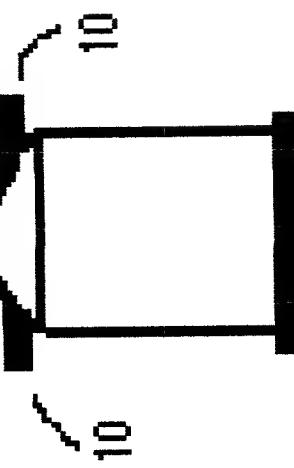


FIG. 5

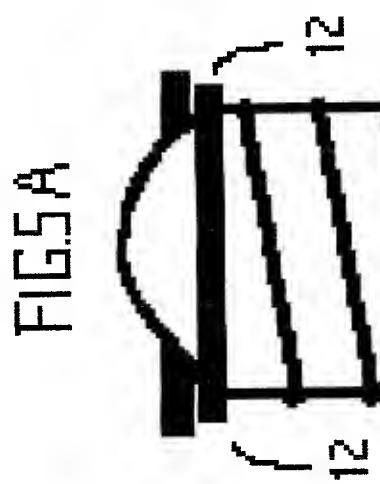
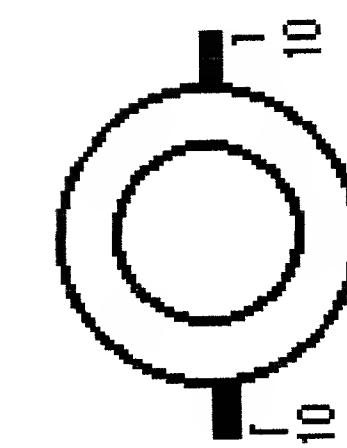
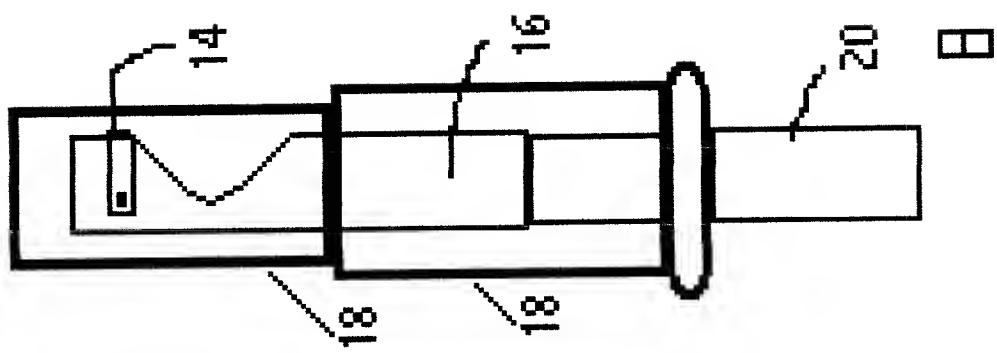


FIG. 6

FIG. 7



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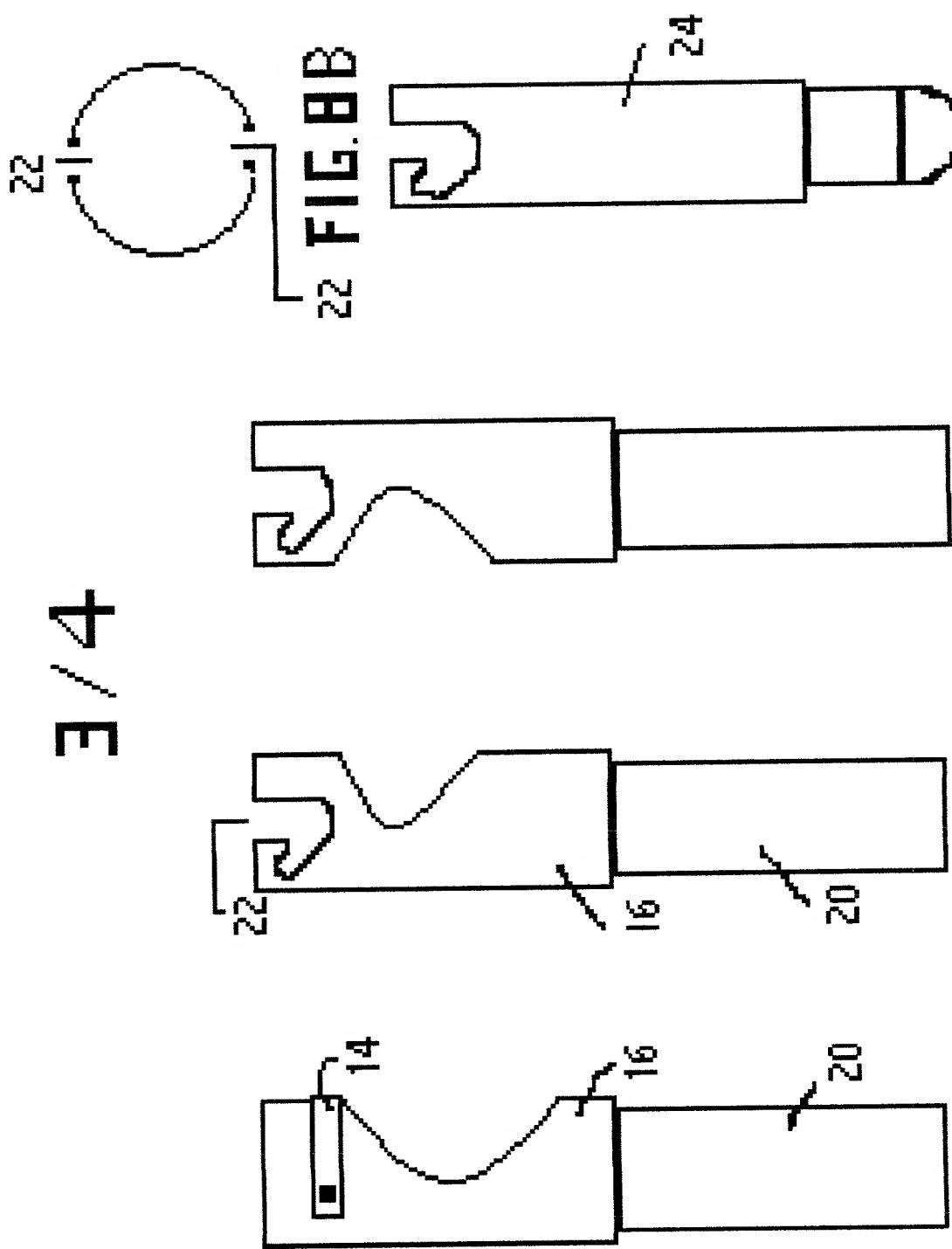
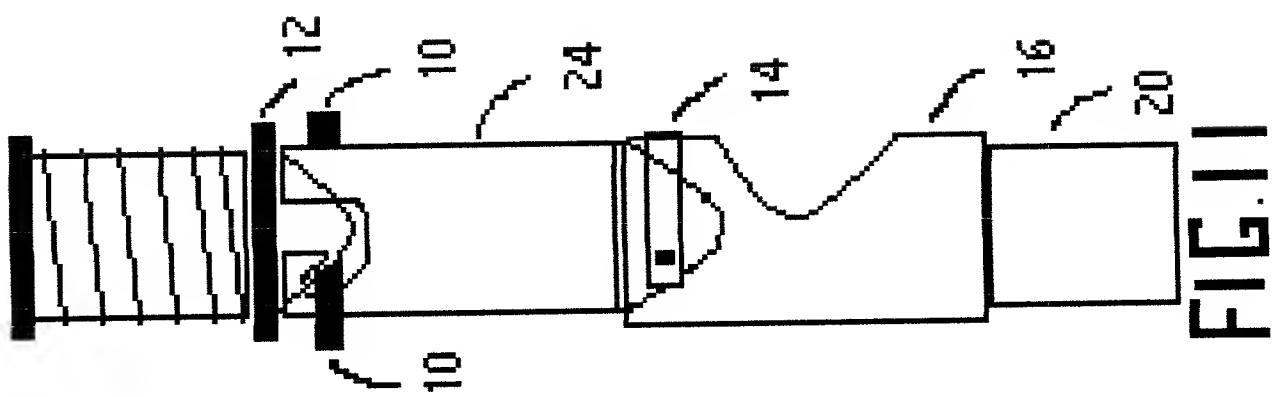
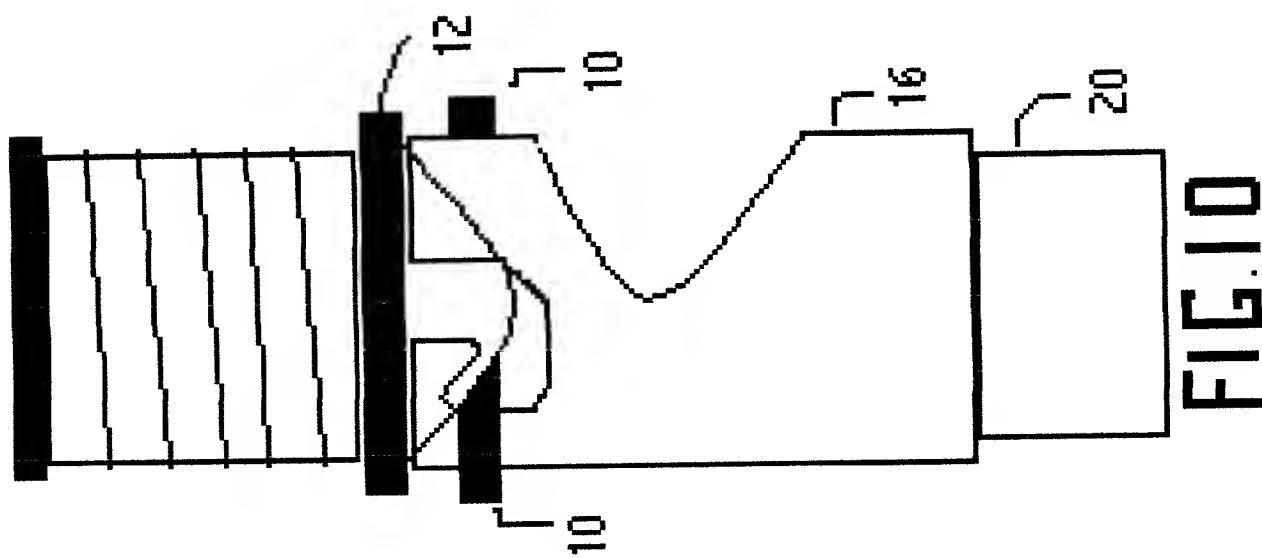


FIG. 7A FIG. 8A FIG. 8B FIG. 9



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**DECLARATION FOR UTILITY OR
DESIGN
PATENT APPLICATION
(37 CFR 1.63)**

Declaration Submitted with Initial Filing

OR

Declaration Submitted after Initial Filing (surcharge (37 CFR 1.16 (e)) required)

Attorney Docket Number

First Named Inventor

COMPLETE IF KNOWN

Application Number

/

Filing Date

Art Unit

Examiner Name

As the below named inventor, I hereby declare that:

My residence, mailing address, and citizenship are as stated below next to my name.

I believe I am the original and first inventor of the subject matter which is claimed and for which a patent is sought on the invention entitled:

Revolutionary connections for spark plugs
and spark plug wires

(Title of the Invention)

the specification of which

is attached hereto

OR

was filed on (MM/DD/YYYY) [redacted]

as United States Application Number or PCT International

Application Number [redacted]

and was amended on (MM/DD/YYYY) [redacted]

(if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment specifically referred to above.

I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR 1.56, including for continuation-in-part applications, material information which became available between the filing date of the prior application and the national or PCT international filing date of the continuation-in-part application.

I hereby claim foreign priority benefits under 35 U.S.C. 119(a)-(d) or (f), or 365(b) of any foreign application(s) for patent, inventor's or plant breeder's rights certificate(s), or 365(a) of any PCT international application which designated at least one country other than the United States of America, listed below and have also identified below, by checking the box, any foreign application for patent, inventor's or plant breeder's rights certificate(s), or any PCT international application having a filing date before that of the application on which priority is claimed.

Prior Foreign Application Number(s)	Country	Foreign Filing Date (MM/DD/YYYY)	Priority Not Claimed	Certified Copy Attached? YES	Certified Copy Attached? NO
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Additional foreign application numbers are listed on a supplemental priority data sheet PTO/SB/02B attached hereto:

[Page 1 of 2]

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DECLARATION — Utility or Design Patent Application

Direct all correspondence to: Customer Number _____ OR Correspondence address below

Name Si-Nin Quan

Address 3186 Yakima circle

City <u>San Jose</u>	State <u>CA</u>	ZIP <u>95121-2433</u>
Country <u>U.S.A.</u>	Telephone <u>408-226-4907</u>	Fax <u>226-4907</u>

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001 and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

NAME OF SOLE OR FIRST INVENTOR: A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]) <u>Si-Nin</u>	Family Name or Surname <u>Quan</u>
Inventor's Signature 	Date <u>Nov 23, 2001</u>

Residence: City <u>San Jose</u>	State <u>CA</u>	Country <u>U.S.A.</u>	Citizenship <u>U.S.</u>
---------------------------------	-----------------	-----------------------	-------------------------

Mailing Address 3186 Yakima circle

City <u>San Jose</u>	State <u>CA</u>	ZIP <u>95121</u>	Country <u>U.S.A.</u>
----------------------	-----------------	------------------	-----------------------

NAME OF SECOND INVENTOR: A petition has been filed for this unsigned inventor

Given Name (first and middle [if any]) <u>Judy, Fei-Man</u>	Family Name or Surname <u>Quan</u>
Inventor's Signature 	Date <u>NOV 23, 2001</u>

Residence: City <u>San Jose</u>	State <u>CA</u>	Country <u>U.S.A.</u>	Citizenship <u>U.S.</u>
---------------------------------	-----------------	-----------------------	-------------------------

Mailing Address 3186 Yakima circle

City <u>San Jose</u>	State <u>CA</u>	ZIP <u>95121</u>	Country <u>U.S.A.</u>
----------------------	-----------------	------------------	-----------------------

Additional inventors are being named on the _____ supplemental Additional Inventor(s) sheet(s) PTO/SB/02A attached hereto.